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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,200	07/21/2000	Heinz Steinhardt	120669.100	7561

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EXAMINER

HASSANZADEH, PARVIZ

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 11/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/625,200

Applicant(s)

STEINHARDT ET AL.

Examiner

Parviz Hassanzadeh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Priority*

Receipt is acknowledged of papers (priority document) submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1, 2, 10, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Azuma et al (JP 9-115686-A) in view of Schmitt III et al (US Patent No. 5,356,672).**

Azuma et al teach a microwave plasma apparatus (Fig. 1) comprising: a microwave plasma source 10 (*a generator to generate an electromagnetic wave*); an inner electrode 1 and an external electrode 2 (*a coaxial conductor in which the electromagnetic wave is guided*); an annular region defined between the inner and the external electrodes in which plasma 7 is

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formed (*at least one plasma zone in which the excited and/or ionized particles are formed by the electromagnetic wave*) wherein the plasma gas is introduced into the annular region (*an interior chamber of the coaxial conductor between an outer conductor and an inner conductor and that the inner chamber forms the plasma zone*) via a valve 6 connected to a gas source 18 (abstract and paragraph 0013 - 0016).

Azuma et al fail to teach the inner electrode being displaceable (adjustable).

Schmitt III et al teach a plasma tube (Fig. 1) wherein an inner tube 30 is adjustable for controlling the location of a plasma 52 within an outer tube 19 (column 4, lines 11-42 and column 5, line 66 through column 6, line 6).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the adjustable mechanism as taught by Schmitt II et al in the apparatus of Azuma et al in order to control the location of plasma within the outer tube (external electrode).

Further, according to *in re Stevens* 101 USPQ 284 (CCPA 1954), making elements adjustable was held to have been obvious.

*Regarding claims 11, 12:* as shown in Fig. 1, the apparatus includes bias magnetic field coil 5 disposed inside and outside of the conductor electrodes 1 and 2 (paragraph 0015).

**Claims 1, 3-10, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Selwyn (US Patent No. 5,961,772) in view of Schmitt III et al (US Patent No. 5,356,672).**

Selwyn teaches an atmospheric plasma jet apparatus (Fig. 1) comprising: a capacitively coupled RF source 12 (*a generator to generate an electromagnetic wave*); a central rod-shaped

electrode 14 and a cylindrical electrically conducting chamber 20 (*a coaxial conductor in which the electromagnetic wave is guided*); an annular region 18 through which plasma gases are passes (*at least one plasma zone in which the excited and/or ionized particles are formed by the electromagnetic wave*) wherein the plasma gases are introduced into the annular region 18 (*an interior chamber of the coaxial conductor between an outer conductor and an inner conductor and that the inner chamber forms the plasma zone*) via an inlet connected to a gas source 16 (column 5, lines 10-31 and column 7, lines 43-61).

Selwyn fails to teach the inner electrode being displaceable (adjustable).

Schmitt III et al teach a plasma tube (Fig. 1) wherein an inner tube 30 is adjustable for controlling the location of a plasma 52 within an outer tube 19 (column 4, lines 11-42 and column 5, line 66 through column 6, line 6).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the adjustable mechanism as taught by Schmitt II et al in the apparatus of Selwyn in order to control the location of plasma within the outer tube (external electrode).

Further, according to *in re Stevens* 101 USPQ 284 (CCPA 1954), making elements adjustable was held to have been obvious.

*Regarding claims 3, 4 (the material composition of the electrically conductive chamber and the central electrode (coaxial conductor)):* The selection of material composition among the commonly used electrically conductor as metal is considered to have been obvious to one of ordinary skill in the art at the time of the invention and thus, it dose not add any new structural element to the apparatus.

*Regarding claims 5-10, 15, 16 (cooling the inner/outer conductor, impedance converter, hollow waveguide, length of the plasma zone being variable, a sensor to monitor the plasma):*

The above cited claims differ from the prior art by specifying various *well known features* in the plasma art.

It is the Examiner's position that a person having ordinary skill in the art at the time of the invention would have found it obvious to modify the apparatus as taught by Selwyn by applying the *well known features* as desired for the intended usage.

**Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Selwyn (US Patent No. 5,961,772) in view of Schmitt III et al (US Patent No. 5,356,672) as applied to claims 1, 3-10, 15 and 16 above, and further in view of Kawase et al (US Patent No. 5,734,143).**

Selwyn in view of Schmitt III et al teach all the limitations of the claim as discussed above except for the generator being a magnetron to generate an electromagnetic wave.

Kawase et al teach a microwave plasma torch (Fig. 1) wherein a coaxial waveguide 5 including an outer conductor 5a and an inner conductor 5b are coupled to a microwave generator via a waveguide 2 (column 4, line 58 through column 5, line 38).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the microwave generator and the waveguide 2 as taught by Kawase et al in the apparatus of Selwyn in view of Schmitt III et al in order to generate an electromagnetic wave in the annular plasma region 18 as an art recognized equivalent for the same purpose. See MPEP 2144.06, Art Recognized Equivalent for the Same Purpose, Substituting Equivalents Known for the Same Purpose (*in re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982)).

**Claims 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Selwyn (US Patent No. 5,961,772) in view of Schmitt III et al (US Patent No. 5,356,672) as applied to claims 1, 3-10, 15 and 16 above, and further in view of Sakudo et al (US Patent No. 4,543,465).**

Selwyn in view of Schmitt III et al teach all the limitations of the claims except for a magnetic system provided outside of the outer conductor.

Sakudo et al teach a high-frequency discharge apparatus (Fig. 1) including a magnetic field generating system including a magnetic field generating coil 7 and a constant current source 11 in order to generate a magnetic field in a discharge space 6, the magnetic field will affect the plasma density characteristic particularly for ion extraction (column 2, lines 23-49 and claim 1).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the magnetic field generating system as taught by Sakudo et al in the apparatus of Selwyn in view of Schmitt III et al in order to generate a magnetic field in the plasma region which will affect the plasma density characteristic particularly for ion extraction.

*Regarding claims 13-14 (variation of magnetic generating system):* the further addition of magnetic rings and rod at the outer and inner conductors are also considered obvious modification and within the general knowledge of one of ordinary skill in the art at the time of the invention.

#### ***Response to Arguments***

Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection. Applicants assert that neither of the prior art of record teach a displaceable inner conductor as required by the newly amended claim 1. The Examiner

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argues that making the inner tube of the coaxial tube of Azuma et al adjustable is considered obvious modification for the general purpose of optimizing the plasma location. For example Schmitt III et al (US Patent No. 5,356,672) teach a plasma tube wherein the inner tube 30 is adjustable such that the plasma volume 52 can be controlled (column 5, line 66 through column 6, line 6).

### *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

*Hitachi ldt* teaches an apparatus (Fig. 7b) including an inner conductor 13 and an outer conductor 12, an inlet port 15 for supplying a plasma gas between the two conductors, wherein a



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plasma is formed from the gas by applying a microwave electromagnetic wave through the conductors;

Srivastava et al (US Patent No. 6,057,645) teach a discharge tube wherein the length of the cavity around the tube is adjustable (Fig. 1).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Parviz Hassanzadeh whose telephone number is (703)308-2050. The examiner can normally be reached on Tuesday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on (703)308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9310 for regular communications and (703)872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0661.

Parviz Hassanzadeh  
Examiner  
Art Unit 1763

p.h.  
November 6, 2002

  
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